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Responses to ADEQ Comments Received November 19, 2013 on "Downstream Areas Data Assessment Report (Revision 2) Mayflower Pipeline Incident Response, Mayflower, Arkansas" Submitted November 8, 2013

ADEQ Comments - Downstream Areas Data Assessment Report, Rev 2 Received Nov 19, 2013

Comments on the Revision 2 of the Downstream Area Remedial Sampling Report.

In addition, attached are additional comments from the Arkansas Game and Fish Commission regarding their review of the ExxonMobil responses and the Revision 2 report. Please prepare responses to each comment and submit a revised report to my attention at ADEQ no later than December 2, 2013. Please addresses responses to the AGFC comments to Mr. Rick Chastain and cc: Tammie J. Hynum.

Comment #1:

Toxic Unit Calculations – The ADEQ calculated a toxic unit (TU) of 1.18 for sediment sample SED-DA-045, which exceeds the target TU of 1.0.

In addition, two sediment samples collected from depths 0.5-1.0 feet below ground surface exceed a TU of 1.0 (SED-DA-006 TU-1.26 and SED-DA-017 TU-1.29). These exceedances were not discussed or evaluated in the text. Please provide justification that a TU exceedance of 1.0 is protective of environmental health. Evaluation using the two-carbon model may be applicable.

Response to Comment #1:
The toxic unit (TU) values in the previous version of the Downstream Areas Data Assessment Report (DADAR) had been reported to one significant figure, which is common for hazard quotients in ecological evaluations. However, the report has been revised to show TU values above 1.0, with a precision of two significant figures. Section 7 of the report has also been updated to discuss TU values that exceed 1.0. As stated in the report, a value that exceeds a TU of 1.0 does not imply risk; rather, it implies that risk may be present and further evaluation may be warranted. The revisions include:

- *SED-DA-045:* A discussion of the two-carbon model TU calculation for the surface sediment sample at location SED-DA-045 was added to Section 7 of the DADAR. As previously presented in Table I-2 of Appendix I, the two-carbon model TU value for this sample was 0.4.

- *SED-DA-006 and SED-DA-017:* For the subsurface sediment (i.e., deeper 0.5 foot below ground surface) samples at these two locations, the TU values (based on the one-carbon model and total organic carbon values in the associated surface sediment sample) were slightly above 1.0, and a qualitative discussion of these results was added to Section 7 of the DADAR. The TU values cannot be further evaluated using the two-carbon model because black carbon was not detected in the surface sediment samples associated with these two locations. However, benthic receptors are generally not exposed to sediment at depth intervals below the biologically active zone which is typically about 10 cm thick. The 0 to 0.5-foot sediment depth interval includes the biologically active zone and therefore there is not a complete exposure pathway to subsurface samples at deeper depth intervals. Because it is unlikely that benthic receptors will be exposed to sediments deeper than 0.5 foot, and moreover, the TU value only slightly exceeds 1.0 using the one-carbon model; it is concluded that risks to benthic and aquatic receptors are not expected at this location.

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Comment #2a:

Ecological Screening Level (ESV) Issues:

a) The Sampling Plan recommended an ADEQ approved hierarchy for ecological screening of soil, sediment, and surface water data. Based on this hierarchy, please revise the current screening tables to represent the following approved ESVs for the corresponding constituents:

Constituent	Medium	Screening Level	Source
Barium	Sediment	20 mg/kg	SQUIRTS
Vanadium	Sediment	57 mg/kg	SQUIRTS
1-Methylnaphthalene	Sediment	21 ug/kg	SQUIRTS
Benzo(g,h,i)perylene	Sediment	170 ug/kg	Region 3
Indeno[1,2,3-cd]pyrene	Sediment	17 ug/kg	Region 3
Trichloroethylene	Soil	1 ug/kg	Region 4
Xylene	Soil	50 ug/kg	Region 4

Response to Comment #2a:

For each constituent listed in the table above, further clarification is provided into the selection of the screening levels provided in the DADAR.

- *Barium:* For barium, the 20 milligrams per kilogram (mg/kg) screening level referenced in the above table was not located in the most recent SQuiRT tables (dated 2008). Please provide the source, and we will evaluate that value further.

- *Vanadium:* During the development of the DADAR, the most recent SQuiRT table (dated 2008) was consulted. For vanadium, the value referenced in the comment is a marine sediment value. The marine sediment screening value for vanadium in the SQuiRT table references unpublished data from the Washington Department of Ecology staff; however, the most recent published Washington Department of Ecology Sediment Benthic Marine Criteria (2013) do not include a value for vanadium (http://www.ecy.wa.gov/programs/tcp/smu/sed_chem.htm). Therefore, referenced marine sediment screening value for vanadium was not included in the DADAR because we were unable to determine the applicability to this freshwater site and apparently, this marine value is no longer in use. At this time, there were no changes to the screening levels in the DADAR based on this comment.

- *1-Methylnaphthalene, Benzo(g,h,i)perylene, Indeno[1,2,3-cd]pyrene:* In the DADAR, the hierarchy was to use the sediment ESVs from Region 4 (if available) before the sediment ecological screening values (ESVs) for Region 3. In the Region 4 sediment screening levels table, screening values are available for 12 Priority Pollutant Polycyclic Aromatic Hydrocarbons (PAHs) and 2-Methylnaphthalene. Screening values are also available for "low molecular weight (LMW) PAHs" and "high molecular weight (HMW) PAHs." The screening value for each of the 13 PAHs in the Region 4 sediment screening table was 330

micrograms per kilogram (µg/kg) and therefore, for the other four Priority Pollutant PAHs and 1-Methylnapthalene that were sampled for as part of the Mayflower Pipeline Incident Response, the PAH screening value of 330 µg/kg was used as well. In addition, the total LMW and HMW PAHs summations were compared to the 330 µg/kg value and a 655 µg/kg, respectively, from Region 4. As previously described in Appendix I (Section 1.1.2):

> "*There is a high degree of uncertainty associated with the available sediment ESVs from Region 4 for PAHs. The 330 µg/kg ESV for individual PAHs and total LMW PAHs is based on a PQL (i.e., does not have ecological significance), and the 655 µg/kg ESV for total HMW PAHs is based on a toxic effect level (TEL). TELs are derived from associations observed between measures of adverse biological effects and the concentrations of analytes measured in sediments that may contain multiple constituents. Using a TEL to derive an ESV may not reflect a constituent-specific response threshold due to unknown co-contaminant and constituent mixture issues, and does not incorporate site-specific factors that influence bioavailability (MacDonald et al. 2000; DiToro et al. 1991). Specifically, the Region 4 ESV for HMW PAHs is based on a TEL measured in estuarine sediment where six of the non-alkylated HMW PAHs were measured and summed (USEPA 2001; MacDonald 1994). Because PAHs are present in mixtures, it is likely that the same sediment in which those six PAHs were measured could have contained many more individual PAHs. In addition, if the PAHs had been measured and summed, the TEL would likely have been higher. Therefore, the use of the sediment ESVs from Region 4 leads to some uncertainty.*"

As such, and as described in the DADAR, the evaluation of PAHs in sediment relied more heavily on the total TU values calculated for each sample as recommended in the latest guidance from the U.S. Environmental Protection Agency (USEPA) regarding PAH sediment toxicity (USEPA 2003, 2012). Therefore, there were no changes to the screening levels in the DADAR based on this comment.

- *Trichloroethylene (TCE):* Primary sources of TCE in the environment are metal cleaning and degreasing operations. It is a chlorinated hydrocarbon and is not associated with crude oil. In the 2001 version of the Region 4 ESVs, the ESV value for TCE of 1 µg/kg was based on a target value from the Netherlands Ministry of Housing, Spatial Planning and Environment (MHSPE), which was identified in 1994. MHSPE target values "indicate the level that has to be achieved to fully recover the functional properties of the soil for humans and plant and animal life" and "give an indication of the benchmark for environmental quality in the long term on the assumption of negligible risks to the ecosystem" (MHSPE 2000). The Netherlands MHSPE source document was updated in 2000 to reflect an ESV for TCE of 100 µg/kg. The ESV for TCE in the DADAR was from the draft updated Region 4 screening levels (USEPA 2011, Appendix I to the DADAR), which reported an ESV for TCE of 100 µg/kg based on the updated MHSPE value. Additionally, the USEPA Region 5 value (112 µg/kg) is similar to the draft updated Region 4 screening levels. Therefore, there were no changes to the ESVs in the main portion of the DADAR based on this comment; however, see the response to Comment #2e for an evaluation using the 2001 version of the Region 4 ESVs.

- *Xylene:* The soil ESV for xylene (50 µg/kg) provided in the 2001 version of the Region 4 ESVs was based on guidance from the Canadian Council for the Ministry of the Environment (CCME) in 1997. The

CCME 1997 guidance was updated in 2007 to reflect a soil ESV for xylene of 100 µg/kg. In addition, xylene was not detected in any of the soil samples collected as part of the Downstream Areas Remedial Sampling Plan (DARSP). Therefore, there were no changes to the ESVs in the main portion of the DADAR based on this comment; however, see the Response to Comment #2e for an evaluation using the 2001 version of the Region 4 ESVs.

In summary, there were no changes to the screening levels in the report. The report will continue to show the following ESVs:

Constituent	Medium	Screening Level	Source
Barium	Sediment	None	--
Vanadium	Sediment	None	--
1-Methylnaphthalene	Sediment	330 µg/kg	Region 4
Benzo(g,h,i)perylene	Sediment	330 µg/kg	Region 4
Indeno[1,2,3-cd]pyrene	Sediment	330 µg/kg	Region 4
Trichloroethylene	Soil	100 µg/kg	Draft Update Region 4
Xylene	Soil	100 µg/kg	Draft Update Region 4

Comment #2b:

Ecological Screening Level (ESV) Issues:

b) Please review all ESVs presented in the DADAR to ensure that they are correct and available for public access from a referenced source.

Response to Comment #2b:
This has been completed. No changes to the ESVs were made.

Comment #2c:

Ecological Screening Level (ESV) Issues:

c) Page 5-4 states that the USEPA does not provide soil ESVs for individual PAHs. This statement is incorrect; ESVs are available from USEPA Regions 4 and 5 for individual PAHs in soil. Please clarify or correct.

Response to Comment #2c:
The DADAR has been revised to clarify this statement. The original statement was referring to USEPA's Ecological Screening Levels (EcoSSLs) for LMW and HMW PAHs. The statement (Section 5.2.2., first bullet, first sentence) has been revised to say *"Soil ESVs for LMW and HMW PAHs were obtained from the USEPA's Ecological Soil Screening Levels (EcoSSLs; USEPA 2007a). The USEPA's EcoSSLs do not provide soil screening levels for individual PAHs."*

Comment #2d:

Ecological Screening Level (ESV) Issues:

d) Table 5-2: The source of soil ESVs for metals is given as "USEPA." Please clarify how these ESVs were derived.

Response to Comment #2d:
Table 5-2 was revised to include references for the individual metal-specific documents that are provided on the USEPA's EcoSSLs website. As previously explained in Appendix I (Section 1.1.1) *"For metals (except for mercury) and for PAHs, the soil ESVs were obtained from the most current USEPA EcoSSLs, available on the EcoSSL website (USEPA 2013a). USEPA EcoSSLs are available for the protection of up to four endpoints: plants, soil invertebrates, bird, and mammals (USEPA 2013a). The lowest EcoSSL value, from those for the four endpoints, was selected as the ESV for each constituent, as shown in Table 5-2 of the report."*

Comment #2e:

Ecological Screening Level (ESV) Issues:

e) The USEPA Region 4 soil ESVs used in the DADAR have not yet been published. Please screen soil values using the publicly available USEPA Region 4 ESVs.

Response to Comment #2e:
The draft updated USEPA Region 4 soil ESVs (provided in Appendix I) are based on source documents that have been updated since the USEPA Region 4 ESVs were released in 2001. Although the summary document has not been published by USEPA Region 4, the source documents are publicly available and represent a more current understanding of the science. Moreover, USEPA Region 4 has specifically requested that the draft updated values be used at other sites. A new Attachment I-3 was added to Appendix I of the DADAR, which compares the 2001 ESVs and USEPA's draft updated ESVs and screens the detected constituents in the soil to the 2001 ESVs.

Comment #3:

Page 10-3: The web address provided as a source for Arkansas Background Soil and Sediment Data does not appear to be a link to the referenced background soil values. Please provide a direct link to the Arkansas Background Soil and Sediment Data used to screen sampling results.

Response to Comment #3:
The web address on Page 10-3 is a link to the U.S. Geological Survey (USGS) website that is used to query and download the Arkansas background values for both the soil and sediment. Unfortunately, there is not a more direct URL to link the USGS values. From this website, the user can choose a format to download the

data (e.g., CSV) and then select the option "Get Data." The results can then be sorted by the "typedesc" column to select "SOIL" for background soil values or "STRM-SED-WET" for background sediment values.

General Note

Please note that ADEQ will consider ExxonMobil's crude oil analysis (along with other factors) in the remedial action process; however, the crude oil analysis cannot be used as a screening tool or to provide the basis of support for No Further Action (NFA) determinations.

Response to General Note:
Comment noted. However, because the drainage ways, Dawson Cove, and Lake Conway are receptors for various chemical compounds due to stormwater runoff, industrial discharges, and other anthropogenic sources, ExxonMobil maintains that it is important to focus the evaluation on the possible impacts from the Pegasus Pipeline release, including whether areas warrant further evaluation as a result of the spill, specifically based on the constituents that were detected in the Wabasca heavy crude oil. ExxonMobil requests further clarification from the ADEQ about why the source material (Wabasca heavy crude oil) is not considered appropriate for screening out constituents for further evaluation (e.g., chlorinated volatile organic compounds) from the DADAR.